

Listing of Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application. It is noted that no claim amendments are proposed in this response.

1. (previously amended) A method for single molecule identification of a target DNA molecule in a random coil state comprising the following steps:

a) attaching an optically distinguishable material to a DNA sequence recognition unit, wherein said DNA sequence recognition unit identifies a specific sequence of DNA in said target DNA molecule, wherein said optically distinguishable material comprises colored microparticles;

b) hybridizing at least two distinct DNA sequence recognition units to said target DNA molecule in a random coil state to form a hybridized DNA complex in a random coil state;

c) passing said hybridized DNA complex in a random coil state in a fluid carrier from a reservoir in a microfluidic device through a narrow channel to cause an acceleration of fluid flow through said channel, thereby causing said hybridized DNA complex to extend into a substantially linear configuration; and

d) detecting two or more distinct said optically distinguishable material on said at least two distinct DNA sequence recognition units in a sequential manner along said substantially linear hybridized DNA complex;

e) determining the sequential order of said optically distinguishable material on said at least two distinct DNA sequence recognition units;

f) determining the sequential order of said specific sequence of DNA from said sequential order of said optically distinguishable material on said at least two distinct DNA sequence recognition units, thereby identifying said target DNA molecule.

2. (canceled)

3. (previously amended) The method of claim 1 wherein said colored microparticles comprise-microparticles having different shapes.

4. (previously amended) The method of claim 1 wherein said colored microparticles comprise dyes, dye aggregates, pigments or nanocrystals.

5. (original) The method of claim 1 wherein said DNA sequence recognition unit comprises DNA, DNA fragments, synthetic oligonucleotides or peptide nucleic acids.

6. (original) The method of claim 1 wherein said DNA sequence recognition units comprise any protein scaffold or synthetic molecular moiety capable of recognizing a specific DNA sequence.

7. (original) The method of claim 1 wherein said narrow channel of said microfluidic device has a width or depth of from about 0.1 μm to about 500 μm .

8. (original) The method of claim 1 wherein said narrow channel of said microfluidic device has a width or depth of about 1 μm to about 300 μm .

9. (canceled)